[0012] Similarly, while the Global Positioning System (GPS) helps to record accurate references above-ground, it fails to record both pig position and pipeline location at the same time. Pipeline owners currently assume all liabilities pertaining to the use of markers and also pay for the transportation to and from job sites for every inspection with smart pigs. Inspection companies use a variety of inspection methods that are frequently unknown to pipeline operators. Operators cannot routinely acquire understanding and knowledge of each such inspection methodology. Furthermore, retraining of crews is often necessary for the prerequisite inspection to occur. Pipeline owners are, of course, billed for installation, transportation, and loss or theft of every magnet or electronic unit used during pipeline inspections. Moreover, typical inspection logistics dictate that magnets be shipped in sufficient numbers or, otherwise, the operator must leap-frog the limited available magnet units during the survey.

[0013] As will be appreciated by those conversant with the art, some geographic locations are not safe for placement of inspection equipment at night particularly during a protracted inspection run. Another inherent infirmity of prior art pipeline inspections is that inspection companies assume little or no liability if the signals produced by these magnets are confused with other signals such as existing taps, patches or any metallic mass that resemble magnet signals. Still another well known problem in the art is that missing magnets leave voids that jeopardize the integrity and accuracy of the inspection. Electronic markers may not be detected by the smart pig due to: malfunction in the additional components, stray radio or electronic signals, deeper than expected pipeline, or misplacement of marker in a multiple corridor of pipelines.

[0014] Problems also arise when signals are recorded in the wrong places. There is presently no method known in the art that distinguishes the units which fail from those that do not. The excavation of defects is usually the only way these problems have been discovered. On several occasions in the field, unfortunately, this happens weeks or even months after the inspection report has been received wherein budgets have already been allocated for repairs of all pipeline defects. Pipeline maintenance is addressed as a program for all defects found by smart pigs, in a repair by repair approach. If an error is discovered it usually means several defects are being excavated in the wrong areas. Many pipelines, unfortunately, are excavated in urban areas with the consequent disruptions of neighborhoods.

[0015] Transportation of goods above-ground is normally regulated and monitored to safeguard the public. If a vehicle or practice is deemed unsafe, measures can be implemented to correct the problem. Similarly, if a specific section of pipe is found to be defective under certain operating conditions, this knowledge can be shared with other operators or regulatory agencies through the use of pipeline positioning coding contemplated under the present invention.

[0016] Accordingly, having a pipeline positioning system taught by the present invention would afford the advantage of a coding structure being emplaced in all sections of pipe and being recorded in an associated database of all pipelines. This database would preferably keep track of pipeline performance under a diversity of operating conditions. Information accumulated by pipeline owners through smart pig inspection—especially relating to noticeable deterioration or improvement of pipelines under certain conditions—could be shared expeditiously among practitioners in the art, thereby resulting in more reliable pipeline performance, increased public safety, and reduced operating costs.

[0017] Thus, there appears to be no available fail-safe and unobtrusive methodology for reliably and accurately identifying and positioning pipelines. Accordingly, these limitations and disadvantages of the prior art are overcome with the present invention, and improved means and techniques are provided that are useful for identifying and positioning pipelines regardless of physical location.

SUMMARY OF THE INVENTION

[0018] The Pipeline Identification And Positioning System ("PIPS") of the present invention comprises a permanent, passive, non-obtrusive, and systematic placement of markers that uniquely identify a pipeline or a specific location in a pipeline. As will be hereinafter described, PIPS assigns an identification code to locations selected by the pipeline operator that may be detected by inspection methods known in the art. As will be appreciated by those skilled in the art, PIPS enables the accurate recording of changes in pipe wall thickness via ultrasonic, radiographic, magnetic detection methods and the like.

[0019] When coupled with satellite readouts of the installation, the system taught by the present invention has been found to be accurate within centimeters of its location for any inspection run, regardless of methodology used or inspection vendor. The particular geographical areas recorded may be used by the pipeline owner, regulatory agencies, inspection companies, government security or safety agencies, etc.

[0020] These and other objects and features of the present invention will become apparent from the following detailed description, wherein reference is made to illustrative examples and to the figures in the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0021] **FIG. 1** depicts a frontal perspective view of a section of pipe showing the PIPS Registration Mark disposed on the external circumference thereof, representing the beginning of code of the preferred embodiment of the present invention.

[0022] **FIG. 2A** depicts a simplified end view of a section of pipe showing the PIPS Registration Mark for beginning of code depicted in **FIG. 1**.

[0023] **FIG. 2B** depicts a simplified end view of a section of pipe showing the PIPS Registration Mark for beginning of code disposed on the internal circumference of a section of pipe.

[0024] **FIG. 2C** depicts a simplified end view of a section of pipe showing the PIPS Registration Mark for beginning of code disposed within the wall structure of a section of pipe.

[0025] **FIG. 3** depicts numeric representation of a plurality of marker coupons of PIPS of the preferred embodiment, and the registration marks for beginning and end of code markings.